

Remarks/Arguments:

No amendments to the claims are made with this Response. Claims 1-3, 6, 7, 9-18, and 20-36 are the pending claims in this application.

I. The Office Action Rejections

Claims 1-3, 6, 7, 9, 10, 13-21, 25, 28-32, 34, and 36 stand rejected as obvious under 35 U.S.C. § 103 based on Wolfbeis et al. (U.S. Patent No. 5,407,829) in view of De Castro (U.S. Patent No. 5,834,626) and Wallach (U.S. Patent No. 6,495,368) and Jeffrey et al. (U.S. Patent No. 5,976,827) and Moretti et al. and Werkhoven et al. and Dojindo online. Claim 11 has been rejected as obvious based on the same seven references listed above and further in view of Walt '490. Claims 12, 24, 26, 27, and 35 have been rejected based on the same seven references listed above and further in view of Horan (U.S. Patent No. 6,149,952). Finally, claims 22 and 33 have been rejected based on the same seven references listed above and further in view of Bacon (U.S. Patent No. 5,030,420).

II. The Applicants' Response

The current Office Action rejects the pending claims under 35 U.S.C. §103(a) as obvious in view of a combination of the teachings of Wolfbeis, De Castro, Wallach, Jeffrey et al., Moretti et al., Werkhoven et al., and Dojindo online. The proposed combination of De Castro with Wolfbeis is critical to all of the rejections made in the Final Office Action.

The applicants contend that the combination of Wolfbeis and De Castro is based on an incorrect read of De Castro. This incorrect read is summarized in the November 9, 2005 Office Action, which stated "De Castro teaches that these advantageous sensors [transition metal complexes] can be used to detect fourteen types of analytes, including hydrogen sulfide," citing col. 13, lines 24-29. The applicants respectfully disagree. De Castro does not disclose that transition metal complexes can be used to detect hydrogen sulfide. What De Castro discloses is the use of transition metal complexes to detect oxygen and thereby calibrate a fixed volume of exhaled air. Then, De Castro discloses that within that fixed volume of air, a person's breath alcohol can be measured by reaction with potassium dichromate. Reconsideration of the rejection is respectfully requested.

A. De Castro

De Castro is directed to a device for detecting the amount of breath alcohol on a person. The person exhales into a device, which calibrates a fixed volume of exhaled breath using a first colorimetric reaction. Within this fixed volume, a second colorimetric reaction occurs, detecting the presence and amount of alcohol in that fixed volume of breath.

The first colorimetric reaction calibrates a volume of exhaled air. The first reaction involves a constant component, M_1 , and a reagent that reacts with the constant component, M_1 . This first colorimetric reaction is the volume indicator.

The second colorimetric reaction identifies whether alcohol is present in that fixed volume of breath. The second colorimetric reaction involves a second component, M_2 , also called the analyte, and a reagent that reacts with the second component, M_2 . The second colorimetric reaction is the analyte indicator.

1. The volume indicator: the constant component M_1 (water or oxygen) and the reagents used to detect M_1

The function of the first colorimetric reaction is to calibrate a fixed volume of exhaled breath, vapor, gas or air. Col. 12, lines 27-30. This volume indicator is described generally at col. 12, lines 15-57 and in more detail beginning at col. 15, line 14 through col. 19, line 53. The volume indicator reagent may be expressed by the exemplary equation: $M_1 = C_1 * F * T$. Col. 12, lines 34-37. M_1 refers to the moles of a constant component, for example oxygen. See col. 13, line 56 and col. 14, line 40. A colorimetric change with the volume indicator indicates that a fixed number of moles of the constant component M_1 (e.g., oxygen or water) have reacted, thereby indicating a fixed volume of exhaled breath.

De Castro provides two working examples of the constant component, M_1 : oxygen and water. De Castro discloses certain reagents that will react with the constant component, when the constant component is oxygen or water. These reagents include transition metal complexes in ligand exchange reactions, for example, cobalt chloride to detect water. Transition metal reagents, as cited by the Examiner, "represent a particularly potent group of [these] reagents." Col. 14, lines 41 and 42. Other reagents disclosed by De Castro include polyalkylpolyamines, macrocyclic compounds, and amino acids (although not transition metals). These reagents are

taught for detecting oxygen, when oxygen is the constant component, M_1 . See col. 14, lines 19-40.

De Castro discloses a first colorimetric reaction to indicate whether a fixed volume of breath has been exhaled. This first colorimetric reaction uses a reagent, such as a transition metal complex, to detect a constant component, M_1 , such as oxygen or water.

2. The analyte indicator: the second component M_2 (the analyte) and the reagents used to detect M_2

The function of the second colorimetric reaction is to detect an analyte of interest. De Castro suggests "at the same time [as the volume indicating indicator] subjecting the device to a second component, whereas with this other [second] component one desires to know whether a certain threshold level [of an analyte] has been attained or exceeded." Col. 12, lines 58-61. The second component may be expressed by the exemplary equation: $M_2 = C_2 * F * T$. Col. 12, lines 65 and 66. M_2 refers to the moles of the second component, for example, the amount of exhaled breath alcohol. See col. 19, lines 60 and 61. De Castro discloses fourteen other analytes (i.e., fourteen other second components) at col. 13, lines 24-28 that may also be desirable to monitor or detect (as previously cited by applicants and the Examiner).

De Castro provides only one working example of the analyte indicator. This example is disclosed under the heading "Immobilization of Monitored Substance Reagent(s)" at col. 19, lines 54 and 55. In this example, the second component, M_2 , (or analyte of interest) to detect is alcohol in exhaled breath. Col. 19, lines 60 and 61. De Castro discloses that alcohol in a person's breath can be reacted with a reagent, e.g., potassium dichromate, in a second colorimetric reaction. Col. 20, lines 3-5.

De Castro provides only one example of a analyte indicator: the reaction of potassium dichromate with an analyte of interest, i.e., breath alcohol. De Castro fails to disclose or teach any other suitable reagents which can be used to detect the fourteen other disclosed potential analytes of interest listed at col. 13, lines 24-28.

B. De Castro fails to teach using the reagent in the first colorimetric reaction to detect one of the fourteen listed potential analytes of interest in the second colorimetric reaction.

The applicants submit that De Castro does not disclose the use of transition metals to detect hydrogen sulfide. As explained above, De Castro discloses a first colorimetric reaction: reacting a reagent with a constant component M_1 , that is, the reaction of a transition metal complex with oxygen or water to determine a fixed volume of exhaled breath. De Castro teaches combining the first colorimetric reaction that determines a fixed volume with a second colorimetric reaction that detects an analyte of interest. The second colorimetric reaction includes reacting the analyte of interest, e.g., alcohol, with a reagent, for example potassium dichromate. Although fourteen potential other analytes of interest are disclosed by De Castro at col. 13, lines 24-28, De Castro fails to disclose that a reagent used in the first colorimetric reaction can also be used to detect an analyte of interest in the second colorimetric reaction.

In the first colorimetric reaction, De Castro discloses the reaction of water or oxygen with cobalt chloride, transition metal complexes, polyalkylpolyamines, macrocyclic compounds, or amino acids. In the second colorimetric reaction, De Castro discloses the reaction of potassium dichromate with alcohol, and lists fourteen other potential analytes of interest, including hydrogen sulfide.

De Castro does not state that the transition metal complexes used in the first colorimetric reaction can be used to detect analytes of interest in the second colorimetric reaction. Moreover, De Castro only discloses potassium dichromate as a reagent to react with alcohol, and fails to disclose any other reagents, let alone reagents that can be used to detect one of the fourteen other listed analytes of interest, including hydrogen sulfide. De Castro states that the reagent to react with the second component will be "selected based upon the material [the second component] one desires to monitor." Col. 13, lines 23 and 24. Thus, if one skilled in the art chooses to monitor hydrogen sulfide, one skilled in the art would look to what reagents De Castro disclosed to detect hydrogen sulfide. De Castro fails, however, to disclose any reagents that react with hydrogen sulfide when hydrogen sulfide is the analyte of interest in the second colorimetric reaction. Furthermore, De Castro also fails to suggest - that is, never connects - that the second component (such as breath alcohol or hydrogen sulfide,

among others) is detectable with any of the disclosed first reagents (which include transition metal complexes).

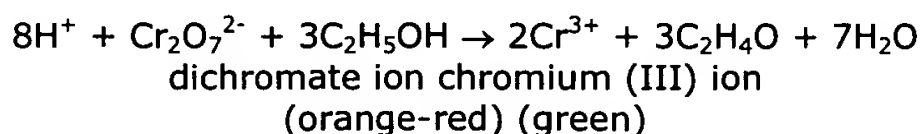
Thus, contrary to the Examiner's read of De Castro, the applicants submit that one skilled in the art would not understand De Castro as teaching detection of the analyte of interest (e.g., hydrogen sulfide) in the second colorimetric reaction with the use of a reagent, such as a transition metal complex, from the first colorimetric reaction.

C. No suggestion of using transition metal complexes to detect hydrogen sulfides can be found in De Castro.

No suggestion that transition metal complexes can be used to detect the analytes of interest in the second colorimetric reaction can be inferred from the disclosure of De Castro. This is because 1) potassium dichromate is not a transition metal complex, and 2) the reaction of potassium dichromate with alcohol is not a ligand exchange reaction.

As would be understood by one of ordinary skill in the art, potassium dichromate is not a transition metal complex. Potassium dichromate is a salt of chromic acid. It is generally referred to as a chromate ion or oxo anion. In contrast, a transition metal complex is produced by reacting a transition metal ion with a neutral or anionic ligand, e.g., ammonia or ethylenediamine tetraacetate (EDTA). Although chromium is a transition metal, potassium is not a neutral or an anionic ligand. A typical transition metal complex can be found in the reaction of a silver ion with ammonia to produce the diamine complex $\text{Ag}^+(\text{NH}_3)_2$.

The reaction of potassium dichromate with alcohol is not considered a ligand exchange reaction. The reaction is simply an oxidation-reduction reaction of chromium (VI) in the orange dichromate ion $\text{Cr}_2\text{O}_7^{2-}$ reduced to the green chromium (III) ion by ethyl alcohol as would be understood by one of ordinary skill in the art from the raw materials used to form the granular indicator for alcohol at col. 20, lines 2-8. The reaction is shown by the following equation:



III. Conclusion

The applicants respectfully disagree with the Examiner's characterization of the teaching of De Castro. The applicants submit that De Castro does not disclose the use of transition metals to detect hydrogen sulfide. Without making the connection that De Castro teaches using transition metal complexes to detect hydrogen sulfide, the applicants submit the combination of De Castro and Wolfbeis fails to disclose each and every feature of the claimed invention. Therefore, the obviousness rejections using the combination of Wolfbeis and De Castro are in error. Reconsideration is respectfully requested.

The Applicants request a telephonic interview with the Examiner to facilitate the prosecution of the application and to discuss De Castro, if necessary. The applicants representatives will call the Examiner to schedule any needed telephonic interview accordingly. Nonetheless, in view of the arguments set forth above, the applicants respectfully request withdrawal of the rejections and request early notification of allowance of the pending claims.

Respectfully submitted,



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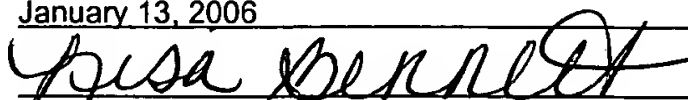
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